

Original Research

Review of published criteria for evaluating health-related websites

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None declared.

Abstract ● **Objective** To review published criteria for specifically evaluating health-related information on the World Wide Web and to identify areas of consensus in evaluation. ● **Design** Search of Web sites and peer-reviewed medical journals for explicit criteria for evaluating health-related information on the Web using Medline and Lexis-Nexis databases and the following Internet search engines: Yahoo!, Excite, Altavista, Webcrawler, HotBot, Infoseek, Magellan Internet Guide, and Lycos. Criteria were extracted and grouped into categories. ● **Results** Twenty-nine published rating tools and journal articles were identified that had explicit criteria for assessing health-related Web sites. Of the 165 criteria extracted from these tools and articles, 132 (80%) were grouped under 1 of 12 specific categories, and 33 (20%) were grouped as miscellaneous because they lacked specificity or were unique. The most frequently cited criteria were those dealing with the content, design, and aesthetics of a site; disclosure of authors, sponsors, or developers; currency of information (includes frequency of update, freshness, and maintenance of site); authority of source; ease of use; and accessibility and availability. ● **Conclusions** Many authors agree on the key criteria for evaluating health-related Web sites and efforts to develop consensus criteria may be helpful. The next step is to identify and assess a clear, simple set of consensus criteria that the general public can understand and use.

Introduction

The large volume of health information resources available on the Internet has great potential to improve health,¹⁻³ but it is increasingly difficult to discern which resources are accurate or appropriate for users.³⁻⁸ Because of the potential for harm from misleading and inaccurate health information,⁹⁻¹⁴ many organizations and individuals have published or implemented criteria for evaluating the appropriateness or quality of these resources.^{15,16} Two published reviews of evaluation criteria for health-related Web sites did not present information on the range of criteria proposed by various authors and included rating tools that were not developed exclusively for health-related sites.¹⁵⁻¹⁷ Our study reviews criteria currently proposed or used specifically to evaluate health-related Web sites.

Methods

Between September 1997 and May 1998, we conducted a search of the Web and of peer-reviewed medical journals for criteria for evaluating health-related information on the Web. We used the Medline and Lexis-Nexis databases and search engines including Yahoo!, Excite, Altavista, Webcrawler, HotBot, Infoseek, Magellan Internet Guide, and Lycos. Medline searches (using PubMed) used variations of the following: "quality," "Internet," "World Wide Web," "computer communication networks/standards," "quality control," and

"medical informatics/standards." Searches with search engines and Lexis-Nexis used "quality," "health information," "health," and variations of "rating," "ranking," "evaluate," "award," and "assess." Investigating references and hyperlinks from initial results identified additional resources. We ended the sampling period when searches produced similar results and when previous search results became outdated.

Criteria

We included criteria if they were explicit, specifically used for evaluating health-related Web sites, and published in a peer-reviewed journal or publicly accessible Web site. We also considered peer-reviewed journals not indexed by Medline. We included resources framed as "guidelines" because there was little difference between them and other criteria and the intent of the authors was similar. When subcriteria provided details about main criteria, we included only the main criteria to prevent overrepresenting that author's perspective. Criteria were extracted and sorted into similar groups according to their wording and description. When a criterion seemed to combine several concepts and could fit into multiple groups, we considered the first mentioned concept.

To examine the reproducibility of the criteria groupings, 4 independent, naive coders assigned 40 randomly selected criteria to the 13 criteria groups. Overall, the coders' assignment of criteria agreed with us 76% of the time. The

agreement coefficient, indicating “percent agreement above chance,” was 0.74.¹⁸ (An extended methods section appears on the World Wide Web at www.bmj.com.)

Results

Twenty-nine rating tools and articles (24 Web sites and 5 journal articles) had explicit criteria for assessing health-related Web sites (Table 1). Of the 165 criteria identified, 132 (80%) were grouped under 12 specific categories (Table 2). Thirty-three (20%) criteria that lacked specificity or were unique were categorized as “miscellaneous.” Frequently cited criteria included those dealing with the content, design, and aesthetics of a site and disclosure of authors, sponsors, or developers.

Discussion

Not surprisingly, “content” of the site, which includes concepts of information quality and accuracy, was the

most commonly cited criterion group. Design and aesthetics of the site and ease of use were the second and sixth most frequently cited groups respectively, indicating that authors highly value good-quality application design and user interfaces. Disclosure of authors, sponsors, or developers was the third most frequently cited group, highlighting the need for users to be able to consider a site’s content in the context of who created or financed the site. It was somewhat surprising that disclosure was not more commonly cited, given recent reports about misleading health information and fraud on the Internet.^{9, 11, 12} Most rating tools discriminated between content and the fourth most common criterion group, currency of information (which includes the frequency of updates, freshness of data, and site maintenance), suggesting that currency of information is nearly as important as the information itself.

Table 1 Rating tools and journal articles with explicit criteria for evaluation of health-related websites

Source of rating tool or article	URL address*
AltiMed/PharmaLINKS	www.altimed.com/links/ratings.html
American Medical Association	www.ama-assn.org/med_link/med_link.htm
Biosites, Pacific Southwest Regional Medical Library	www.library.ucsf.edu/biosites/help/guidelines.html
British Healthcare Internet Association	www.bhia.org/public/reference/recommendations/medpubstandards.htm
Growth House	www.growthhouse.org/award.html
Health A to Z	www.healthatoz.com/aboutus.htm
Health Information Institute’s Aesculapius Awards	www.hii.org/judging.htm
Health On the Net Foundation	www.hon.ch/HONcode/Conduct.html
Health Summit I Mtg/Mitretek Systems	www.mitretek.org/hiti/showcase/documents/criteria.html
Health Web	healthweb.org/wg/content/papers/guidelines.html
Healthfinder	www.healthfinder.gov/aboutus/selectionpolicy.htm
Larkin, M. Health information on-line. <i>FDA Consumer</i> 1996; 30:21-5.	www.fda.gov/fdac/features/596_info.html
McGill University Health Sciences and Osler Libraries, Canada	www.health.library.mcgill.ca/resource/criteria.htm
Medical Matrix	www.medmatrix.org/info/sitesurvey.html
Medsite Navigator, Guide to Digital Science and Medicine	www.medsitenavigator.com/mail/submit.html
Mental Health Net	www.cmhc.com/help/ratings.htm
Mountain and Plains Partnership	www.uchsc.edu/csa/areahec/home/mapp/8aWWW.html#public
Nutrition Navigator	navigator.tufts.edu/ratings.html
Organizing Medical Networked Information	omni.ac.uk/agec/evalguid.html
Physician’s Choice	www.mdchoice.com/instruc.htm
Psych Central: Best of the Web in Mental Health	www.grohol.com/rateguid.htm
Reference 6	www.ama-assn.org/sci-pubs/journals/archive/jama/vol_277/no_15/ed7016x.htm
Reference 8	www.bmj.com/archive/7098ip2.htm
Reference 16	Not available online
Reference 19	Not available online
Sympatico’s HealthyWay Health Links	www1.sympatico.ca/healthyway/GENERAL/info_2.html
The Six Senses Review	www.sixsenses.com/FAQ.html#rating
The Virtual Hospital	indy.radiology.uiowa.edu/Beyond/PeerReviews/o1Introduction.html
The Wilton Library	w3.nai.net/~wla/eval.htm

*Because of the dynamic nature of the World Wide Web, some URLs may have changed. URLs prefixed with <http://>

Table 2 Frequency of explicit criteria for evaluation of health-related web sites by criteria groups*

Criteria groups	Frequency (%) (n=165)
Content of site (includes quality, reliability, accuracy, scope, depth)	30 (18)
Design and aesthetics (includes layout, interactivity, presentation, appeal, graphics, use of media)	22 (13)
Disclosure of authors, sponsors, developers (includes identification of purpose, nature of organization, sources of support, authorship, origin)	20 (12)
Currency of information (includes frequency of update, freshness of data, maintenance of site)	14 (8)
Authority of source (includes reputation of source, credibility, trustworthiness)	11 (7)
Ease of use (includes usability, navigability, functionality)	9 (5)
Accessibility and availability (includes ease of access, fee for access, stability)	9 (5)
Links (includes quality of links, links to other sources)	5 (3)
Attribution and documentation (includes presentation of clear references, balanced evidence)	5 (3)
Intended audience (includes nature of intended users, appropriateness for intended users)	3 (2)
Contact addresses or feedback mechanism (includes availability of contact information, contact address)	2 (1)
User support (includes availability of support and documentation for users)	2 (1)
Miscellaneous (includes criterion that lacked specificity or were unique)	33 (20)

Percentage total does not equal 100 due to rounding-off.

*Of 5 authors who assigned weights or priorities to their proposed criteria, 4 cited content and 1 cited peer review (categorized as miscellaneous) as the most important criterion.

Criteria related to confidentiality and privacy of information were only cited by one author, despite widespread interest in this issue.²⁰ Some health-related Web sites are already collecting personal health information to “tailor” content, and as sites begin to integrate health care services and information, confidentiality and privacy safeguards will become increasingly important.²⁰⁻²²

The limitations of our review include the subjective variables around the scope of the criteria categories used. Testing of the category groupings, however, showed that they were reproducible by others. It is also possible that some authors used the same terms for criteria to describe different concepts. Because subcriteria were not included, some concepts may not have been represented. The

inherent limitations of search engines and the dynamic nature of the Web also prevented us from locating all existing published criteria.²³ Nevertheless, our review located more sources of criteria specifically for health-related sites than did previous reviews.^{15,17}

Conclusion

Given the evolving state of the Internet, it may be difficult or even inappropriate to develop a static tool or system for assessing health-related Web sites. Our results suggest that many authors agree on key criteria and that efforts to develop consensus criteria may be helpful.^{6,16,24-26} The next step is to identify and assess a clear, simple set of consensus criteria that the public can understand and use. Tools that integrate the criteria need to be developed and validated, and their ultimate impact and effectiveness in assisting the public with health-related decisions should be monitored to ensure that they remain useful.

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Key messages

- Many organizations and individuals have published criteria to evaluate health-related information on the World Wide Web
- A search of the literature and the Web found that the most frequently cited criteria were those dealing with the content, design, and aesthetics of a site; the disclosure of authors, sponsors, or developers; the currency of information; the authority of the source; and ease of use
- Criteria related to confidentiality and privacy were only cited by one author
- A consensus on the critical criteria for evaluating Web-based health information seems to be emerging
- Many authors agree on key criteria for evaluating health-related Web sites, and efforts to develop a set of key criteria may be helpful

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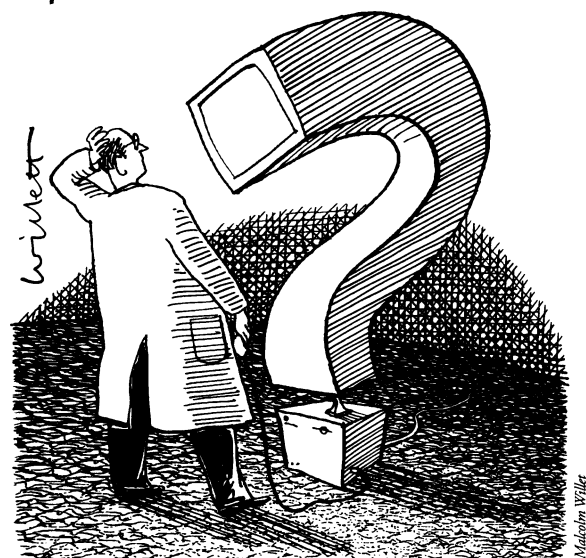
COMMENTARY

How patients use the web for second opinions

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Do I need a prostate-specific antigen test? Should I change my allergy medication? Do I really need surgery for this lump in my breast? Where can I find the best specialist care for my child's illness? Our patients and their families have many important questions. Traditionally, one's personal physician has been the professional source first turned to for answers. The time-honored role of the physician is as a counselor as much as a healer. Information provided by a trusted professional can override uncertainty and confusion and bring peace of mind, hope, and even healing.

Times change, however, and with them the means to answer health and medical related questions. Witness the Internet, increasingly available in homes, workplaces, libraries and schools. A recent Harris poll found that 60 million American adults, 68% of those who use the Internet, have used the World Wide Web to find health information. Who among the practicing medical profession can't describe a recent instance in which a patient begins a question with: "I was reading on the web the other night and..."? Sometimes, this can be a pleasant experience in which both doctor and patient share in mutual edi-



fication. On the other hand, sometimes the information the patient gleaned from the Web might vary from the clinician's own knowledge and experience. Time permitting, this presents an excellent opportunity for patient